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CLAIMS:

- 1. An isolated polypeptide comprising a portion of CFTR (cystic fibrosis transmembrane conductance regulator) protein of between 10 and 100 amino acids, said portion comprising 18 amino acids as shown in SEQ ID NO: 1.
- 2. The polypeptide of claim 1 which comprises 22 amino acids as shown in SEQ ID NO: 2.
- 3. The polypeptide of claim 1 wherein the polypeptide is fused to a membranepenetrating peptide.
- 4. The polypeptide of claim 2 wherein the polypeptide is fused to a membranepenetrating peptide.
- 5. The polypeptide of claim 3 wherein the membrane-penetrating peptide is selected from the group consisting of: VP-22 (SEQ ID NO: 3), (SEQ ID NO: 4), and (SEQ ID NO: 5).
- 6. The polypeptide of claim 4 wherein the membrane-penetrating peptide is selected from the group consisting of: VP-22 (SEQ ID NO: 3), (SEQ ID NO: 4), and (SEQ ID NO: 5).
- 7. The polypeptide of claim \ which is free of phosphorylation.
- 8. A method of activating a CFTR protein comprising:

applying a polypeptide to a CFTR protein which forms a cAMP regulated chloride channel, said polypeptide comprising a portion of CFTR protein of between about 10 and 100 amino acids, said portion comprising 18 amino acids as shown in SEQ ID NO: 1, whereby the open probability of the channel formed by the CFTR increases by at least 25%.

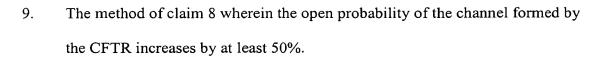
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- 10. The method of claim 8 wherein the open probability of the channel formed by the CFTR increases by at least 75%.
- 11. The method of claim 8 wherein the open probability of the channel formed by the CFTR increases by at least 100%.
 - 12. The method of claim 8 wherein the open probability of the channel formed by the CFTR increases by at least 125%.
 - 13. The method of claim 8 wherein the open probability of the channel formed by the CFTR increases by at least 150%.
 - 14. The method of claim 8 wherein the open probability of the channel formed by the CFTR increases by at least 200%.
 - 15. The method of claim 8 wherein the CFTR protein is a mutant which reaches a cell's plasma membrane but fails to undergo full activation.
 - 16. The method of claim 15 wherein the CFTR protein is listed at http://www.genet.sickkids.on.ca/cftr-cgi-bin/fulltable.
 - 17. The method of claim 8 wherein the step of applying is performed by administering an aerosolized polypeptide to a patient with a mutant CFTR protein.
- 20 18. The method of claim 8 wherein the CFTR protein is in a lipid bilayer and a change in conductance is measured upon applying the polypeptide.
 - 19. The method of claim 8 wherein the step of applying the polypeptide is accomplished by administering a nucleic acid encoding the polypeptide to a patient who expresses the CFTR protein, whereby the polypeptide is



- 20. The method of claim 19 wherein the nucleic acid is administered as an aerosol to the patient's airways.
- 21. A method of activating a CFTR protein comprising:

applying a polypeptide to a CFTR protein which forms a cAMP regulated chloride channel, said polypeptide comprising a portion of CFTR protein of between 10 and 100 amino acids, said portion comprising 22 amino acids as shown in SEQ ID NO: 1, whereby the open probability of the channel formed by the CFTR increases by at least 25%.

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- 22. The method of claim 21 wherein the open probability of the channel formed by the CFTR increases by at least 50%.
- 23. The method of claim 21 wherein the open probability of the channel formed by the CFTR increases by at least 75%.
- 24. The method of claim 21 wherein the open probability of the channel formed by the CFTR increases by at least 100%.
- 25. The method of claim 21 wherein the open probability of the channel formed by the CFTR increases by at least 125%.
- 26. The method of claim 21 wherein the open probability of the channel formed by the CFTR increases by at least 150%.
- 27. The method of claim 21 wherein the open probability of the channel formed by the CFTR increases by at least 200%.
- 28. The method of claim 21 wherein the CFTR protein is a mutant which reaches a cell's plasma membrane but fails to undergo full activation.

- 29. The method of claim 28 wherein the CFTR protein is listed at http://www.genet.sickkids.on.ca/cftr-cgi-bin/fulltable.
- 30. The method of claim 21 wherein the step of applying is performed by administering an aerosolized polypeptide to a patient with a mutant CFTR protein.
- 31. The method of claim 21 wherein the CFTR protein is in a lipid bilayer and a change in conductance is measured upon applying the polypeptide.
- 32. The method of claim 21 wherein the step of applying the polypeptide is accomplished by administering a nucleic acid encoding the polypeptide to a patient who expresses the CFTR protein, whereby the polypeptide is expressed.
- 33. The method of claim 32 wherein the nucleic acid is administered as an aerosol to the patient's airways.
- 34. The method of claim 8 or 21 wherein the polypeptide is free of phosphorylation.

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